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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/507,258	09/10/2004	Giuseppe Pezzotti	PO9409US00/DEJ	4864
881 7590 09/24/2008 STITES & HARBISON PLLC 1199 NORTH FAIRFAX STREET SUITE 900 ALEXANDRIA, VA 22314			EXAMINER RAMDHANE, BOBBY	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/507,258

Applicant(s)

PEZZOTTI, GIUSEPPE

Examiner

BOBBY RAMDHANIE

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) 1-16 and 29-43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 17-28 and 44-57 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 September 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB08)  
Paper No(s)/Mail Date 09/10/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Group I Claims 17-28 & 44-57 in the reply filed on 06/11/2008 is acknowledged. The traversal is on the ground(s) that the applicant asserts a proper analysis of the claims was not used to issue the restriction requirement. This is not found persuasive because the prior art of record does indeed disclose the "stress measuring device."
2. Applicant claims that the recitation of the "stress measuring device" in the preamble is not the common technical feature but merely a preamble recitation of the broad invention being claimed. Claim 17 discloses the broadest common technical feature which links all of the applicant's alleged inventions. This common technical feature is disclosed the in the prior art of record.
3. For Instance, Claim 17 recites, "A stress measuring device characterized by comprising A). An electron beam irradiating means unit that irradiates an electron beam on a specimen, B). A spectroscopy means unit that analyzes light generated from the specimen by the electron beam irradiating means unit so as to obtain a spectrum, and C). A stress calculating means unit that obtains a stress change generated in the specimen based on a spectrum shift between a spectrum obtained from the specimen in a predetermined state and a spectrum obtained from the specimen in a state different from the predetermined state." Please see the following prior art references which disclose the applicant's alleged invention.

4. Schlichting et al (2000), discloses the stress measuring device characterized by comprising A). An electron beam irradiating unit that irradiates an electron beam on a specimen (See Figure 2; Laser), B). A spectroscopy unit that analyzes light generated from the specimen by the electron beam irradiating means unit so as to obtain a spectrum (See Figure 2, filter, grating and ccd array), and C). A stress calculating means unit that obtains a stress change generated in the specimen based on a spectrum shift between a spectrum obtained from the specimen in a predetermined state and a spectrum obtained from the specimen in a state different from the predetermined state (See Figure 2 microscope & computer).

5. Muraki et al (2001), discloses the stress measuring device characterized by comprising A). An electron beam irradiating unit that irradiates an electron beam on a specimen (See Section 3.2; exciting laser), B). A spectroscopy unit that analyzes light generated from the specimen by the electron beam irradiating means unit so as to obtain a spectrum (See 3.2, Raman Spectrometer), and C). A stress calculating means unit that obtains a stress change generated in the specimen based on a spectrum shift between a spectrum obtained from the specimen in a predetermined state and a spectrum obtained from the specimen in a state different from the predetermined state (See Section 3.2 optical microscope).

6. Yoshikawa et al (1995), discloses the stress measuring device characterized by comprising A). An electron beam irradiating unit that irradiates an electron beam on a specimen (See Experiment Section; Laser), B). A

spectroscopy unit that analyzes light generated from the specimen by the electron beam irradiating means unit so as to obtain a spectrum (See Experiment Section, Ramanor U-1000), and C). A stress calculating means unit that obtains a stress change generated in the specimen based on a spectrum shift between a spectrum obtained from the specimen in a predetermined state and a spectrum obtained from the specimen in a state different from the predetermined state (See Experiment Section objective lens & multi-channel detector 2).

7. Muraki et al (1997) discloses the stress measuring device characterized by comprising A). An electron beam irradiating unit that irradiates an electron beam on a specimen (See 2.2; Raman Spectroscopy, argon laser), B). A spectroscopy unit that analyzes light generated from the specimen by the electron beam irradiating means unit so as to obtain a spectrum (See 2.2, Raman Spectroscopy, T64000 Jobin Yvon, ISA), and C). A stress calculating means unit that obtains a stress change generated in the specimen based on a spectrum shift between a spectrum obtained from the specimen in a predetermined state and a spectrum obtained from the specimen in a state different from the predetermined state (See 2.2 Raman Spectroscopy optical microprobe & microscope).

8. Galiotis et al (1999), discloses the stress measuring device characterized by comprising A). An electron beam irradiating unit that irradiates an electron beam on a specimen (See Figure 6a; Laser), B). A spectroscopy unit that analyzes light generated from the specimen by the electron beam

irradiating means unit so as to obtain a spectrum (See Figure 6a, Spectrometer), and C). A stress calculating means unit that obtains a stress change generated in the specimen based on a spectrum shift between a spectrum obtained from the specimen in a predetermined state and a spectrum obtained from the specimen in a state different from the predetermined state (See Figure 6a microscope & Figure 6b Raman probe).

9. Finally, Pezzotti (1999), discloses the stress measuring device characterized by comprising A). An electron beam irradiating unit that irradiates an electron beam on a specimen (See Page 869, Fluorescence and Raman Spectroscopy; Laser), B). A spectroscopy unit that analyzes light generated from the specimen by the electron beam irradiating means unit so as to obtain a spectrum (See Page 869, Fluorescence and Raman Spectroscopy; T64000), and C). A stress calculating means unit that obtains a stress change generated in the specimen based on a spectrum shift between a spectrum obtained from the specimen in a predetermined state and a spectrum obtained from the specimen in a state different from the predetermined state (See Page 869, Fluorescence and Raman Spectroscopy; microscope, monochromator, and ccd camera).

10. The requirement is still deemed proper and is therefore made FINAL.

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the doping

unit and a minute sample obtaining unit must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claim 51 recites a doping unit. The Specification does not disclose this unit.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 17-21, 23-25, 27, 28, 44-48, 50, 54, 56, & 57 are rejected under 35 U.S.C. 102(b) as being anticipated by Galiotis et al 1999.

3. Applicant's claims are toward a device.

4. Regarding Claims 17-21, 23-25, 27, 28, 44-48, 50, 54, 56, & 57, Galiotis et al discloses the stress measuring device characterized by comprising A). An electron beam irradiating unit that irradiates an electron beam on a specimen (See Figure 6a; Laser), B). A spectroscopy unit that analyzes light generated from the specimen by the electron beam irradiating unit so as to obtain a spectrum (See Figure 6a, Spectrometer), and C). A stress calculating unit that obtains a stress change generated in the specimen based on a spectrum shift between a spectrum obtained from the specimen in a predetermined state and a spectrum obtained from the specimen in a state different from the predetermined state (See Figure 6a microscope & Figure 6b Raman probe).

5. Additional Disclosures Included: Claim 18: The stress measuring device described in claim 17, and characterized by the above-mentioned stress calculating unit is to obtain a residual stress based on a spectrum shift between a specimen spectrum as being a spectrum in a state that no stress exists in the



specimen and a stress impressed spectrum as being a spectrum in a state that a residual stress exists in the specimen (See Rejection for Claim 17. The device of Galiotis et al is capable of performing this method); Claim 19: The stress measuring device described in claim 17 characterized by that an external force impressing means unit that applies an external force to the specimen is further provided (See Figure 6b, mechanical tester); Claim 20: The stress measuring device described in claim 19, and characterized by that the above-mentioned stress calculating unit is to obtain an internal stress from a spectrum shift between an internal stress impressed spectrum in a state that the internal stress is generated in the specimen by the external stress impressing means unit and the above-mentioned specimen spectrum or the above-mentioned stress impressed spectrum (See Figure 6b, the device of Galiotis et al is capable of performing this method); Claim 21: The stress measuring device described in claim 17 characterized by that a minute amount sample obtaining unit that obtains a minute amount of sample from the spectrum is further provided; Claim 23: The stress measuring device described in claim 17 characterized by that an external light irradiating unit that irradiates external light whose spectrum is known is further provided (See Page 901 Single Fiber and 2D composite coupons, 3<sup>rd</sup> line down 514.5 nm line of an Argon ion laser); Claim 24: The stress measuring device described in claim 17 characterized by that a visualizing unit that visualizes a portion to be measured of the above-mentioned specimen is further provided (See Page 903 Left Column CCTV camera); Claim 25: The stress measuring device described in claim 17 characterized by that a diameter

of a beam spot of an electron beam irradiated by the above-mentioned electron beam irradiating means unit is not more than 100 nm (See Page 901 Single Fiber and 2D composite coupons, 2 $\mu$ m diameter spot); Claim 27: A stress measuring device characterized by comprising A). A light irradiating process unit that irradiates irradiating light on a specimen, B). A spectroscopy process unit that analyzes light generated from the spectrum by the above-mentioned light irradiating process so as to obtain a spectrum, and C). A stress calculating process unit that obtains a stress change generated in the specimen based on a spectrum shift between a spectrum obtained from the specimen in a predetermined state and a spectrum obtained from the specimen in a state different from the predetermined state, wherein the light irradiating process unit includes a broad area light irradiating process that irradiates irradiating light without narrowing down the irradiating light on a broad area that is broad enough compared with a spot size of the irradiating light that is narrowed down to obtain a requested space resolution, and in the above-mentioned stress calculating process unit a spectrum obtained by analyzing light generated from the specimen by the broad area light irradiating process is made to be a specimen spectrum as being a spectrum in a state that no stress exists in the specimen (See rejections above and Figure 6); Claim 28: The stress measuring device characterized by comprising a light irradiating process unit that irradiates irradiating light on a specimen, a spectroscopy process unit that analyzes light generated from the spectrum by the above-mentioned light irradiating process unit so as to obtain a spectrum, and a stress calculating process unit that obtains a stress change

generated in the specimen based on a spectrum shift between a spectrum obtained from the specimen in a predetermined state and a spectrum obtained from the specimen in a state different from the predetermined state, wherein the above-mentioned light irradiating process unit includes a broad area light irradiating process that irradiates irradiating light on a broad area that is broad enough compared with a spot size of the irradiating light that is narrowed down to obtain a requested space resolution with scanning the spot size, and in the above-mentioned stress calculating process unit an average of spectra of light generated by irradiating each irradiating light in the broad area light irradiating process is made to be a specimen spectrum as being a spectrum in a state that no stress exists in the specimen (See rejections above and Figure 6);

Claim 44: A system for measuring stress in a specimen with an electron beam comprising: A). An irradiating unit for providing an electron beam to irradiate the specimen (See Figure 6a Laser); B). A measuring unit for providing measurement signals of the radiation from the specimen after contact with the electron beams (See Figure 6a Spectrometer); and C). A calculating unit for calculating the stress from the measurement signals by determining a spectrum shift between a first spectrum of a predetermined reference state and a second spectrum measured at a predetermined measurement position on the specimen (See Figure 6a microscope and Figure 6b Raman probe); Claim 45: The system of Claim 44 wherein the first spectrum of the predetermined reference state is determined by the calculating unit by averaging a plurality of measurements across the specimen to approximate a stress-free state for the specimen (See

Rejections of Claim 44, the system of Galiotis et al is capable of performing this method); Claim 46: The system of Claim 45 wherein the irradiating unit directs the electron beam to enable a plurality of measurements representative of an area of the specimen which is approximately 100 times as large or larger than the predetermined measurement position (See Rejections of Claim 44, the system is capable of performing this method); Claim 47: The system of Claim 44 further including a stress force applying unit wherein the predetermined reference state is determined by measuring the first spectrum while exerting a stress force on the specimen of a predetermined value and the second spectrum at the predetermined measurement position is measured without exerting the stress force (See Figure 6b); Claim 48: The system of Claim 47 wherein the stress force is applied mechanically to the specimen (See Figure 6b); Claim 50: The system of Claim 47 wherein the predetermined reference state is measured over a plurality of different stress forces to correlate the amount of external force and the corresponding spectrum shift (See Figure 6b, the mechanical tester is capable of performing a variety of different stresses); Claim 54: The system of Claim 44 further including a composition analyzing unit for determining the composition of the specimen and adjusting the calculate stress on the basis of the determined composition relative to a predetermined composition standard for the specimen (See Figure 6a computer); Claim 56: The system of Claim 44 further including a light radiating unit for illuminating the specimen with light and a light measuring unit for measuring radiation from the specimen after contact with the light radiation to provide a peak reference for compensation of the electron

beam calculated stress (See Figure 6a. The system is capable of performing this function); Claim 57: The system of Claim 44 wherein the predetermined measurement position is irradiated by an electron beam having a diameter of 10 nm or less from the irradiating unit (See Page 901 Single Fiber and 2D composite coupons, 2  $\mu$ m diameter).

6. Claim 44 is rejected under 35 U.S.C. 102(b) as being anticipated by Schlichting et al 2000,

7. Applicant's claims are toward a device.

8. Regarding Claim 44, Schlichting et al discloses the system for measuring stress in a specimen with an electron beam comprising: A). An irradiating unit for providing an electron beam to irradiate the specimen (See Figure 2a Argon Laser); B). A measuring unit for providing measurement signals of the radiation from the specimen after contact with the electron beams (See Figure 2a, filter, diffraction grating, & CCD array); and C). A calculating unit for calculating the stress from the measurement signals by determining a spectrum shift between a first spectrum of a predetermined reference state and a second spectrum measured at a predetermined measurement position on the specimen (See Figure 2a microscope and computer).

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been

obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 22 & 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galiotis et al in view of Xu et al (US2001/0017059).

12. Applicant's claims are toward a device.

13. Regarding Claim 22, Galiotis et al discloses the stress measuring device described in claim 17 except wherein the device is further characterized by that a composition analyzing unit that analyses a partial difference of composition of the specimen is further provided. Xu et al discloses this feature (See [0015]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Galiotis et al with the analyzing unit of Xu et al because this would allow for a wide variety of stresses to be observed on a given material (See Figure 4).

14. For Claim 49, Galiotis et al discloses the system of Claim 47, except wherein the stress force is applied thermally to the specimen (on a macroscopic scale). Xu et al discloses this feature (See Friction (Figure 4), tensile (Figure 4), and torsional (Figure 8)). It would have been obvious to one of ordinary skill in the

art at the time the invention was made to modify the device of Galiotis et al with the analyzing unit of Xu et al because this would allow for a wide variety of stresses to be observed on a given material (See Figure 4).

15. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Galiotis et al in view of Kakibayashi et al (US5278408).

16. Applicant's claims are toward a device.

17. Regarding Claim 26, Galiotis et al discloses the stress measuring device described in claim 17 except wherein it is further characterized by that the above-mentioned electron beam irradiating means unit is a scanning electron microscope (SEM). Kakibayashi et al discloses this feature (See Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made modify the device of Galiotis et al with the SEM of Kakibayashi because this would allow for a 3-dimensional analysis of the specimen under stress which in turn would allow the observation of point defects and impure atoms to be observed.

18. Claims 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schlichting et al.

19. Applicant's claim is toward a system.

20. Regarding Claim 51, Schlichting et al discloses the system of Claim 44, except for further including a doping unit for preparing the specimen to be measured by including within the specimen a predetermined material that can be

activated by the electron beam to emitting radiation. Schlichting et al does however use doping of the specimen (a thermal barrier coating with chromium) to produce a thermal barrier coating which would be activated by the electron beam. It would have been obvious to one of ordinary skill in the art to explicitly include a doping unit to alter the concentrations of chromium in the thermal barrier coatings, which has been shown to influence the shift of the wavelengths of the that indicate stress on the specimen (See Page 70 Left Column).

21. Claims 52 & 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schlichting et al in view of Amano et al (US4774150).

22. Applicant's claim is toward a system.

23. Regarding Claim 52, Schlichting et al discloses the system of Claim 51 except wherein the predetermined material includes at least one element from a lanthanoid series of elements. Schlichting et al does however disclose the use of transition metals for use in photoluminescence measurements to indicate stress in thermal barrier coatings comprising YSZ specimens. Amano et al discloses the use of lanthanoid series elements for doping in photoluminescence measurements to indicate stress in YSZ specimens. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the YSZ of Schlichting et al with lanthanoid series elements because according to Amano et al, the lanthanoid elements used can produce numerous colors such as blue-green and also red fluorescence (See Column 2 lines 34-37).



24. For Claim 53, the combination of Schlichting et al and Amano et al discloses the system of Claim 52, wherein the ratio of the lanthanoid element to the specimen is within a range of 1 ppm to approximately 10000 ppm (See Schlichting et al Table 4, Cr <sup>3+</sup> ion concentration & See Amano et al Column 2 lines 39-42).

25. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Galiotis et al.

26. Applicant's claim is toward a system.

27. Regarding Claim 55, Galiotis et al discloses the system of Claim 44, except for further including a temperature control unit for controlling the temperature of the specimen during the measurement to a predetermined temperature. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a temperature control unit for controlling the temperature of the specimen during the measurement to a predetermined temperature because it is well known in the art that at different temperatures, specimens take on different characteristics and properties and fluctuations of temperature during experimental processes can have adverse effects on the data collected.

***Telephonic Inquiries***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BOBBY RAMDHANIE whose telephone

number is (571)270-3240. The examiner can normally be reached on Mon-Fri 8-5 (Alt Fri off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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